REMARKS

The Official Action dated March 9, 2010 has been carefully considered. Accordingly, it is believed that the present Amendment responds fully to the outstanding matters and places this application in condition for allowance. Reconsideration is respectfully requested.

By the present Amendment, claim 1 is amended to include limitations from claim 4, and claims 4, 16 and 38 are cancelled. Claims 8, 20 and 44 are amended to change their dependency from cancelled claims to pending claims. Claims 63-65 are added and support for these claims may be found at page 23, lines 10-15 and 23-26. It is believed the present changes do not involve any introduction of new matter, whereby entry is in order and is respectfully requested.

Claims 1-3, 5-13, 15, 17-22, 33-37, 39 and 41-65 are pending. Applicants request rejoinder of claims 6, 7, 9-13, 15, 17-22 and 33-37, 39 and 41-65, which all now depend directly or indirectly from claim 1, upon allowance of claim 1.

In the Official Action, the inventors' Declaration dated (filed) August 18, 2006 was asserted as defective on the basis that non-initialed and/or non-dated alterations were made. Specifically, the addresses of inventors Granéli, Reimhult, Svedhem, Pfeiffer and Höök had been changed by handwritten notation and the citizenship of inventors Reimhult, Svedhem and Höök had been inserted by hand. On December 4, 2006, a Declaration signed by inventors Granéli and Pfeiffer, complete with correct addresses and citizenships, was submitted. Further, submitted herewith are three Declarations respectively signed by inventors Reimhult, Svedhem and Höök, complete with correct addresses and citizenships. It is therefore submitted that the Declaration filed December 4, and the three Declarations submitted herewith overcome the objections to the Declaration filed August 18, 2006 and complete the requirements of 37 C.F.R. §1.52 and 1.63. Reconsideration is respectfully requested.

Claim 5 was objected to on the basis that the phrase "said linker" should be clarified. Claim 5 is amended herein to recite "vesicle-attached" linker. Accordingly, the objection has been overcome. Reconsideration is respectfully requested.

Claims 1-5 and 8 were rejected under 35 U.S.C. §102(a) and (e) as being anticipated by the Bredehorst et al published PCT Application WO 02/081739 A2 (WO '739). In response to Applicants' previous arguments, the Examiner asserted that Bredehorst anticipates the present claims by teaching a biologically functional surface immobilized multi-layer structure comprising a plurality of vesicles (affinity liposomes) sufficiently spaced apart from the surface, referring to page 5, lines 17-27 and Figs. 1-4. The Examiner asserted that the vesicles are directly attached to the structure by surface-immobilized linkers (analyte and/or capture oligonucleotides) with vesicle-attached linkers (affinity components) and optionally by vesicle-attached linkers to another vesicle, referring to Fig. 4. Finally, the Examiner asserted that the vesicles comprise the biologically active compounds which provide the structure with its biological functionality, referring to page 5, lines 17-27.

This rejection is traversed and reconsideration is respectfully requested. As defined by claim 1, the present invention is directed to a biologically-functional, surface-immobilized multilayer structure which comprises a plurality of vesicles sufficiently spaced apart from said surface. The vesicles are directly attached to the structure by binding surface-immobilized linkers with vesicle-attached linkers and, optionally, by binding vesicle-attached linkers to vesicle-attached linkers of other vesicles. Importantly, the surface-immobilized linkers and the vesicle-attached linkers comprise oligonucleotides and binding of one linker to another linker is mediated through hybridisation of said linker oligonucleotides. The vesicles comprise a biologically active compound which provides the structure with biological functionality.

WO '739 does not disclose such a structure. That is, WO '739 discloses liposome-linked closely spaced array electrode assays for detecting and quantifying nucleic acids. With reference to Figs. 1 and 4 of WO '739 relied on by the Examiner, WO '739 employs surface bound capture oligonucleotide 2, and target DNA 3 is reacted with the surface-bound capture oligonucleotide 2. An intercalating residue 6 inserts in the resulting region 4 of DNA double helix to bind an affinity liposome 5 containing redox mediator 8. As described at page 24, intercalating agents are planar aromatic ring structures of appropriate size and geometry that can be inserted between base pairs in double-stranded DNA. In the embodiment of Fig. 3, WO '739 employs a polymeric carrier molecule 10, hapten 11 and anti-hapten antibody 12 between the liposome 5 and the intercalating agent 6. Finally, in the embodiment of Fig. 2, WO '739 employs surface bound capture oligonucleotide 2, and target DNA 3 is similarly reacted with the surface-bound capture oligonucleotide 2. Single stranded oligonucleotides 9 are used to bind the liposomes 5 to the target DNA.

Thus, the liposomes 5 of WO '739 are not directly attached to the structure by surface-immobilized linker oligonucleotides binding vesicle-attached linker oligonucleotides as required by claim 1. To the contrary, the liposomes 5 of WO '739 are attached to the surface-bound capture oligonucleotide 2 by an intercalating residue 6 inserted in the region 4 of DNA double helix (Figs. 1 and 4), by an intercalating residue 6 inserted in the region 4 of DNA double helix and a polymeric carrier molecule 10, hapten 11 and anti-hapten antibody 12 (Fig. 3), or by target DNA 3 and an oligonucleotide 9. Each of these embodiments require that a surface bound oligonucleotide and target DNA hybridize, either to form the double helix region into which the intercalating agent is inserted (Figs. 1, 3 and 4) or to provide an oligonucleotide for hybridization with the liposome-attached oligonucleotide. Thus, the liposome attachment of WO '739 is

dependent on the presence of target DNA. The material of WO '739 is therefore very different from the surface-immobilized multilayer structure of claim 1 wherein vesicles are directly attached to the structure by binding surface-immobilized linker oligonucleotides with vesicle-attached linker oligonucleotides, and therefore without an intercalating agent or target DNA therebetween, and the binding of one linker to another linker is mediated through hybridisation of these linker oligonucleotides, and not dependent on the presence of target DNA.

Additionally, contrary to the requirements of claim 1, WO '739 does not disclose a biologically-functional multilayer structure or vesicles which comprise a biologically active compound which provides the structure with biological functionality. Rather, WO '739 discloses that the affinity liposomes contain encapsulated electrochemically detectable reporter molecules, preferably redox mediators, e.g. hydrochinones, naphthols, or organimetals like complexes of Os, Ru or Co or the like (see the paragraph bridging pages 8-9 of WO '739). The affinity liposomes do not contain a biologically active compound and as a result, the structure of WO '739 is not biologically functional. To the contrary, once the structure of WO '739 is prepared by capturing target DNA and attaching the affinity liposomes thereto, either through intercalating agents (Figs. 1, 3 and 4) or target DNA and oligonucleotides (Fig. 2), the resulting structure containing the bound liposomes is not biologically functional.

Anticipation under 35 U.S.C. §102 requires that each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). In view of the failure of WO '739 to disclose vesicles directly attached to the structure by binding surface-immobilized linker oligonucleotides with vesicle-attached linker oligonucleotides and the failure of WO '739 to disclose liposomes containing a biologically active compound, WO '739 does not expressly or inherently describe

each and every element as set forth in claim 1. Accordingly, WO '739 does not anticipate claim 1, or claims 2, 3, 5 and 8 dependent thereon, and the rejection under 35 U.S.C. §102 has been overcome. Reconsideration is respectfully requested.

Claims 1-5 and 8 were also rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-22 of co-pending application Serial No. 10/590,877. Although this is a provisional rejection, Applicants traverse the rejection on the basis that the present claims 1-3, 5 and 8 are patentably distinct from claims 1-22 of the co-pending application. That is, as noted above, the present claims are directed to a biologically-functional, surface-immobilized multilayer structure which comprises a plurality of vesicles sufficiently spaced apart from said surface, wherein the vesicles are directly attached to the structure by binding surface-immobilized linker oligonucleotides with vesicle-attached linker oligonucleotides. Claims 1-22 of the co-pending application recite an oligonucleotide having at least two hydrophobic anchoring moieties capable of being attached to a lipid membrane. The oligonucleotide of the co-pending application increases the stability of a linker attached to a lipid membrane by using a hydrophobic anchoring unit and is not required by and does not render obvious the multilayer structure of lipid vesicles according to the present claims. Accordingly, withdrawal of the obviousness-type double patenting rejection is respectfully requested.

It is believed that the above represents a complete response to Official Action, and places the present application in condition for allowance. In the event there are any outstanding issues relating to this application, the Examiner is urged to telephone the undersigned to efficiently resolve the same. Reconsideration and an early allowance are requested.

Please charge any fees required in connection with the present communication, or credit any overpayment, to Deposit Account No. 503915.

Respectfully submitted,

/Holly D. Kozlowski/
Holly D. Kozlowski, Reg. No. 30,468
Porter, Wright, Morris & Arthur LLP
250 East Fifth Street, Suite 2200
Cincinnati, Ohio 45202
(513) 369-4224